LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Amended) A power generating system comprising:

a compressor configured for compressing ambient air into compressed air having a pressure greater than at least [about] four atmospheres and an elevated temperature;

a combustion chamber connected to the compressor, wherein the combustor is configured to receive flow of compressed air from the compressor;

fuel injection means for injecting fuel into the combustion chamber;

liquid injection means for injecting a vaporizable non-flammable liquid into the combustion chamber;

a combustion controller for independently controlling the quantity, pressure and temperature of the compressed air, the fuel delivered to the fuel injection means, and the vaporizable liquid delivered to the liquid injection means so the injected fuel and at least a portion of the compressed air is combusted and the injected liquid is transformed into a vapor in the combustor to create, in the combustion chamber, a working fluid consisting of a mixture of unburned compressed air components, fuel combustion products and the vapor during combustion at a predetermined combustion temperature; and

a work engine coupled to and supplied with the working fluid formed in the combustion chamber.

2. (Original) The power generating system according to claim 1 further including an ignition sparker for igniting the injected fuel and compressed air.

3. (Amended) The power generating system according to claim 1, [wherein the power generating system] further including:
condenser means for condensing a desired portion of the vapor from the working fluid; and exhaust means for exhausting the remaining portion of the working fluid.

4. (Amended) The power generating system according to claim 1 further including:
condenser means for condensing the vapor from the working fluid exiting the work engine back to a vaporizable liquid,
recycle means for delivering said vaporizable liquid to the liquid injection means, and
exhaust means for exhausting the remainder of the working fluid [to the compressor for recompression].

5. (Original) The power generating system according to claim 1 further including one or more additional combustion chambers receiving the compressed air, fuel and vaporizable non-flammable liquid configured such that working fluid from all combustion chambers is delivered to one or more work engines.

6. (Amended) The power generating system according to claim 1 wherein the work engine receiving the [work] working fluid is selected from the group consisting of [one or more of] a steam turbine, gas turbine, reciprocating, Wankel, and cam [engine] engines, and shaft drive units.

7. (Amended) The power generating system according [[of]] to claim 1, wherein the compressor and work engines are turbine type devices, and wherein said devices are connected by at least one shaft.

8. (Original) The power generating system according to claim 1, wherein the combustion controller controls the combustion temperature using information transmitted from temperature detectors located in the combustion chamber.

9. (Amended) The power generating system according to claim 1, wherein the combustion controller [control means] controls the liquid injection means and fuel injection means during combustion such that the [weight] mass flow of injected liquid is at least about two times the [weight] mass flow of injected fuel so that the quantity of delivered vaporizable liquid

is controlled to maintain the average temperature of the working fluid delivered to a desired work engine to a desired operating temperature.

10. (Amended) The power generating system according to claim 9, wherein the combustion [control means] <u>controller</u> controls the air flow and fuel injection means such that the ratio of weight of injected fuel to weight of injected air is from about 0.03 to about 0.066 during combustion.

11. (Original) The power generating system according to claim 10, wherein the combustion controller independently controls the average combustion temperature and the fuel to air ratio.

12. (Amended) The power generating system according to claim 9, wherein:

the combustion temperature is controlled by the combustion [control means] controller so that the air to fuel ratio is selected to obtain stoichiometric burning and

the temperature of the working fluid is adjusted by controlling the delivery of the quantity of non-flammable vaporizable liquid, the temperature adjustment being provided substantially only by the latent heat of vaporization of said liquid.

13. (Original) The power generating system according to claim 9, wherein at least about 95% of the oxygen in the compressed air is combusted in the combustion chamber.

14. (Amended) The power generating system according to claim 9, wherein the pressure of the compressed air is maintained at a pressure of 4 to 100 atmospheres[, while entropy of the engine is held substantially constant].

15. (Amended) The power generating system according to claim 1, wherein the pressure of the compressed air is maintained constant while the temperature of combustion and the quantity of working fluid is varied[,] by the combustion controller by adjustment of the quantity of

non-flammable vaporizable liquid fed to one or more liquid injection means located throughout the combustion chamber.

16. (Original) The power generating system according to claim 1 wherein all chemical energy in the injected fuel is converted during combustion into thermal energy, the non-flammable liquid is water, and vaporization of the water into steam creates cyclonic turbulence that assists molecular mixing of the fuel and air such that stoichiometric combustion is effectuated.

17. (Original) The power generating system according to claim 1 wherein the liquid injection means is a series of one or more nozzles located in the combustion chamber fed by a pressurized liquid supply.

18. (Amended) The power generating system according to claim 1 wherein the liquid injected into the combustion chamber is water which is transformed into steam and <u>which cools</u> the combustion products [are cooled substantially, solely by the latent heat of vaporization of water].

19. (Original) The power generating system according to claim 18 wherein the injected water absorbs heat energy so that the temperature of the working fluid is reduced to that of a maximum operating temperature of the work engine.

20. (Amended) The power generating system according to claim 18 wherein the injected water is transformed by way of a flash process into steam [at the pressure of the combustion chamber without additional work for compression and without additional entropy].

21. (Amended) The power generating system according to claim 18, wherein the engine is a power turbine powered by the working fluid [consisting essentially of steam, unoxidized nitrogen, inert gases in the compressed air, carbon dioxide and non-flammable components of the

fuel] <u>comprising steam, nitrogen, inert gases, carbon dioxide, excess oxygen, un-burned components of the fuel, and pollutants</u>.

22. (Original) The power generating system according to claim 18, wherein the water injected is used to control the combustion temperature and the maximum operating temperature of the work engine and to prevent the formations of gases and compounds that cause or contribute to the formation of atmospheric smog.

23. (Amended) The power generating system according to claim 1 wherein the fuel injection means comprises at least one nozzle located [in] <u>to deliver fuel into</u> the combustion chamber, said nozzle being fed by a pressurized fuel supply.

24. (Original) The power generating system according to claim 21 wherein the fuel supply is selected from the group consisting of diesel fuel, well-head oil, propane, natural gas, methane, gasoline, alcohol and mixtures thereof.

25. (Original) The power generating system according to claim 1 wherein the injected liquid is non-potable water, and further includes means in the combustor to remove inorganic materials from the water after vaporization and collect such inorganic materials from the combustor.

26. (Amended) The power generating system according to claim [24] <u>25</u> further including a condenser for collecting potable water after the non-potable water has been vaporized in the combustion chamber.

27. (Canceled)

28. (Amended) The power generating system according to claim [27] <u>1</u>, wherein the ratio of water weight to fuel weight injected ranges from about 8 to 1 to about 1:1 as the rpm of the engine is increased.

29. (Amended) A method of operating a power generating system comprising the steps of:

compressing ambient air into compressed air having a pressure of at least [about] four atmospheres, and having an elevated temperature;

delivering the compressed air into a combustion chamber;

injecting controlled amounts of fuel into the combustion chamber;

injecting controlled amounts of a non-flammable liquid into the combustion chamber;

independently controlling the amount of compressed air, the amount of fuel injected, and the amount of liquid injected so as to combust the injected fuel at least a portion of the compressed air and to transform the injected liquid into a vapor;

wherein a working fluid consisting of a mixture of a non-flammable components of the compressed air, fuel combustion products and vapor is generated in the combustion chamber during combustion at a predetermined combustion temperature.

30. (Amended) The method of claim 29 further including the step of igniting the fuel using an [ignition sparker] igniter.

31. (Amended) The method of claim 29, [wherein the power generating system] further [includes] including the steps of:

condensing a desired portion of the vapor from the working fluid; and

exhausting the remaining portion of the working fluid.

32. (Amended) The method of claim 29, wherein the power generating system further includes the steps of:

condensing the vapor from the working fluid,

delivering at least a portion of the condensed vapor back into the combustor, and

delivering at least a portion of the remainder of the working fluid to [the] a downstream compressor for recompression.

33. (Original) The method of claim 29 further including the step of delivering the working fluid to at least one work engine.

34. (Original) The method of claim 29, wherein the compressed air is further heated by contact within outer surfaces of the combustion chamber prior to being delivered into the combustion chamber.

35. (Amended) The method of claim 29, wherein the amount of liquid and fuel injected is controlled during combustion such that the ratio of weight of injected liquid to weight of injected fuel is at least about two to one so as to control the average temperature in the combustion chamber to a [deliver] desired work engine operating temperature.

36. (Original) The method of claim 35, wherein the air flow and fuel injection is controlled such that the ratio of weight of injected fuel to weight of injected air is approximately 0.03 to 0.066 during combustion.

37. (Original) The method of claim 36, wherein the average temperature in the combustion chamber and the fuel to air ratio are independently controlled.

38. (Original) The method of claim 37, wherein the combustion temperature is controlled to obtain complete combustion of the fuel with the conversion of all carbonaceous material fed to the combustion chamber to CO.sub.2.

39. (Original) The method of claim 35, wherein at least 95% of the oxygen in the compressed air is combusted in the combustion chamber.

40. (Original) The method of claim 35, wherein the pressure of the compressed air is maintained at a pressure of 4 to 100 atmospheres, while entropy of the engine is held approximately constant.

41. (Amended) The method of claim 29, wherein the pressure of the compressed air is maintained constant while the temperature and quantity of working fluid [is] are varied.

42. (Original) The method of claim 29 wherein all chemical energy in the injected fuel is converted during combustion into thermal energy and the vaporization of liquid creates turbulence in the combustion chamber to cause intimate mixing of the fuel and air such that complete combustion is effectuated.

43. (Amended) The method of claim 29 wherein:
the liquid injected into the combustion chamber is water which is transformed into steam following injection into the combustion chamber; and
the temperature in the combustion chamber is controlled substantially [totally] by way of [the latent heat of vaporization of] such water.

44. (Original) The method of claim 43 wherein the quantity of injected water is chosen so as to absorb the heat energy caused by combustion sufficient to reduce the temperature of the working fluid to a desired work engine operating temperature.

45. (Original) The method of claim 43 wherein the injected water is transformed by way of a flash process into steam at a pressure of the combustion chamber without additional work for compression and without additional entropy or enthalpy.

46. (Amended) The method of claim 43, wherein the working fluid is comprised [substantially only] of steam, unoxidized nitrogen, [non-flammable] unburned components of the compressed air and fuel, and carbon dioxide.

47. (Original) The method of claim 43, wherein the water injection is used to control the combustion temperature and to prevent the formations of gases and compounds that cause or contribute to the formation of atmospheric smog.

48. (Original) The method of claim 29 wherein the injected fluid is non-potable water, and further including the steps of vaporizing the non-potable water in the combustion chamber and removing any contaminating materials dissolved in the non-potable water from the combustion chamber separately from the working fluid.

49. (Original) The method of claim 48 further including the step of condensing potable water from the working fluid after the non-potable water has been vaporized in the combustion chamber.

50. (Original) The method according to claim 29 wherein during the operation of the power generating system at greater than a predetermined rpm, liquid injection and the portion of compressed air combusted is held constant with respect to fuel as engine rpm increases, during the operation of the engine between the first and a second predetermined rpm, the liquid/fuel ratio and air/fuel ratio is increased, and below the second predetermined rpm, the liquid/fuel ratio and air/fuel ratio are held constant.

51. (Original) The method of claim 43 wherein cooling of the engine is effectuated with water and without dilution air.

52. - 55. (Canceled)

56. (Twice Amended) [The process of claim 54] <u>A process of continuously delivering a working fluid to the exit of a combustion chamber, the working fluid having enhanced power generating capacity when compared with working fluid produced in a combustion chamber operating only with a fuel and air feed, comprising:</u>

<u>a) creating a combustible mixture by continuously combining fuel under pressure and compressed air in the combustion chamber, the air being provided in at least a stoichiometric quantity,</u>

<u>b) igniting the combustible mixture to create a continuously burning flame which produces a hot gas stream including combustion products, and</u>

<u>c) injecting a vaporizable, liquid thermal diluent into the hot gas stream to reduce the temperature of the hot gas stream,</u>

<u>the injected liquid thermal diluent rapidly becoming a vapor upon entering the combustion chamber,</u>

<u>the combination of the hot gas stream and vapor constituting the working fluid,</u>

<u>the quantity and the temperature of the thermal diluent being selected to produce a desired temperature in the working fluid at the exit of the combustion chamber,</u>

the temperature and dwell time of the hot gas stream being controlled to cause substantially full combustion of the fuel while the temperature of the working fluid is controlled to minimize formation of nitrogen oxides and maximize formation of carbon dioxide,

wherein the thermal diluent is water and the temperature of the working fluid exiting the combustion chamber is controlled to a selected temperature between about 750° F and about 2500° F by the injection of the water, the temperature of the water just prior to injection is controlled between about 595° F and about 700° F [at a temperature not more than about 50° F. below that of the working fluid exiting the combustion chamber].

57. - 60. (Canceled)

61. (Twice Amended) [The process of claim 52] A process of continuously delivering a working fluid to the exit of a combustion chamber, the working fluid having enhanced power generating capacity when compared with working fluid produced in a combustion chamber operating only with a fuel and air feed, comprising:

a) creating a combustible mixture by continuously combining fuel under pressure and compressed air in the combustion chamber, the air being provided in at least a stoichiometric quantity,

b) igniting the combustible mixture to create a continuously burning flame which produces a hot gas stream including combustion products, and

c) injecting a vaporizable, liquid thermal diluent into the hot gas stream to reduce the temperature of the hot gas stream,

the injected liquid thermal diluent rapidly becoming a vapor upon entering the combustion chamber,

the combination of the hot gas stream and vapor constituting the working fluid,

the quantity and the temperature of the thermal diluent being selected to produce a desired temperature in the working fluid at the exit of the combustion chamber,

the temperature and dwell time of the hot gas stream being controlled to cause substantially full combustion of the fuel while the temperature of the working fluid is controlled to minimize formation of nitrogen oxides and maximize formation of carbon dioxide,

wherein the [inert liquid] thermal diluent is non-potable water and the process further includes the steps of:

[collection of] collecting inorganic materials dissolved in the non-potable water in the combustion chamber, and

[the conversion of] converting the inorganic materials to a solid form.

62. (Amended) The power generating system of claim 1 further including at least one heat transfer means positioned external and circumferential to the combustion chamber and extending along a substantial portion of the length of the combustion chamber such that the compressed air flows over external surfaces of the combustion chamber prior to entering the combustion chamber,

the temperature of the compressed air being elevated by heat [radiated] from said external surfaces.

63. (Amended) The power generating system of claim 62 wherein the heat transfer means comprises at least two contiguous [circumferental] circumferential chambers.

64. (Amended) A power generating system comprising

a) a combustion chamber,

b) a work engine coupled to the combustion chamber,

c) fuel supply means for delivering fuel to the combustion chamber,

d) air supply means for delivering compressed air at an elevated temperature and [at a constant] pressure to the combustion chamber the amount of air being chosen so that at least about 90% of the oxygen in the air is consumed when burned with the fuel, the fuel and air being mixed in the combustion chamber,

e) [control] means for controlling the delivery [to vary the quantity] of air [supplied to the combustion chamber] and [to adjust the amount of fuel supplied] fuel to the combustion chamber so that the fuel to air ratio remains about constant,

f) a fuel igniter for igniting the mixture of fuel and air to produce a combustion vapor stream,

g) liquid supply means for delivering superheated water under pressure to the combustion chamber,

the water being converted substantially instantaneously upon entering the combustion chamber to steam,

the delivery and formation of steam creating turbulence and mixing in the combustion chamber

resulting in a working fluid composed of steam, combustion products and non-flammable materials in the air and fuel, said working fluid being delivered to the work engine,

h) a combustion chamber temperature controller,

said controller delivering the superheated water to the combustion chamber in quantities sufficient to maintain the temperature of the working fluid at a desired level, [substantially all of the control of the temperature in the combustion chamber being derived from the latent heat of vaporization of the water introduced into the combustion chamber,] and

i) heat exchanging means for transferring heat from the working fluid exiting the work engine to the water,

said heat elevating the temperature of the water from a feed temperature to the desired temperature for delivery to the combustion chamber.

65. (Twice Amended) The [process] system of claim 64, [also] further including [the step] a means of delivering additional [non-flammable liquid] water to the compressed air prior to introduction of the compressed air into the combustion chamber.

66. (Amended) The [process] system of claim 64 wherein the compressed air is mixed with the fuel in at least two stages such that a portion of the air is mixed with the fuel, the fuel is ignited and then the remainder of the air is added to the fuel at a point downstream of the fuel igniter.

67. - 74. (Canceled)

75. (Amended) A generating system comprising

a) a combustion chamber,

b) fuel supply means for delivering fuel to the combustion chamber,

c) air supply means for delivering compressed air at an elevated temperature and [at a constant] pressure to the combustion chamber the amount of air being chosen so that at least about 90% of the oxygen in the air is consumed when burned with the fuel, the fuel and air being mixed in the combustion chamber,

d) control means to vary the quantity of air supplied to the combustion chamber and to adjust the amount of fuel supplied to the combustion chamber so that the fuel to air ratio remains [about

constant] <u>within a desired range</u>,

e) a fuel igniter for igniting the mixture of fuel and air to produce a combustion vapor stream,

f) liquid supply means for delivering superheated water under pressure to the combustion chamber,

<u>at least part of</u> the water being <u>rapidly</u> converted <u>to steam</u> [substantially instantaneously] upon entering the combustion chamber [to steam], the delivery and formation of steam creating turbulence and mixing in the combustion chamber resulting in a working fluid composed of steam, combustion products <u>unreacted components of the air</u> and [non-flammable materials in the air and] <u>unburned</u> fuel,

said working fluid being a high temperature [steam] stream deliverable to an external piece of equipment at a controlled pressure required by that external piece of equipment,

g) a combustion chamber temperature controller, said controller delivering the superheated water to the combustion chamber in quantities sufficient to maintain the temperature of the working fluid at a desired level,

[substantially all] <u>most</u> of the control of the temperature in the combustion chamber being derived from [the latent heat of vaporization] <u>a change in enthalpy</u> of the water introduced into the combustion chamber, and

h) heat exchanging means for transferring heat from the working fluid exiting the [work engine] <u>external piece of equipment</u> to the water, said heat elevating the temperature of the water from a feed temperature to [the] <u>a</u> desired temperature for delivery to the combustion chamber.

76. (Amended) A method of operating a power generating system comprising the steps of:

compressing ambient air into compressed air having a pressure of at least [about] four atmospheres, and having an elevated temperature;

delivering the compressed air into a combustion chamber;

injecting controlled amounts of fuel into the combustion chamber;

injecting controlled amounts of a non-flammable liquid into the combustion chamber;

independently delivering additional non-flammable liquid to the compressed air prior to introduction of the compressed air into the combustion chamber;

independently controlling the amount of compressed air, the amount of fuel injected, and the amount of liquid injected so as to combust the injected fuel and at least a portion of the compressed air and to transform the injected liquid into a vapor;

wherein a working fluid consisting of a mixture of a non-flammable components of the compressed air, fuel combustion products and vapor is generated in the combustion chamber during combustion at a predetermined combustion temperature.

77. (New) The power generating system according to claim 1, wherein the amount of water injection and the amount of compressed air combusted are kept constant.

78. (New) The power generating system according to claim 1, wherein the water to fuel ratio is increased as the amount of excess air is decreased.

79. (New) The power generating system according to claim 1, wherein the ratio of injected water to fuel is held constant and the amount of compressed air combusted is held constant.

80. (New) The power generating system according to claim 4, further including a compressor to recompress and exhaust the remainder of the working fluid to at least ambient pressure.

81. (New) The method of claim 29, wherein at least 81% of the oxygen in the compressed air is combusted in the combustion chamber.

82. (New) The power generating system according to claim 1 further including at least a second work engine coupled to receive working fluid from the combustor.

83. (New) The power generating system according to claim 1, further including at least one temperature detector operative to determine temperature in the combustion chamber.

84. (New) The power generating system according to claim 1, wherein:

the combustion controller is operative to select the air to fuel ratio to obtain stoichiometric burning and

the temperature of the working fluid is adjusted by controlling the delivery of the quantity of non-flammable vaporizable liquid, the temperature adjustment being provided substantially by the vaporization of said liquid.

85. (New) The power generating system of claim 1, further including at least one heat transfer device positioned circumferentially around to the combustion chamber and extending along a substantial portion of the length thereof,

the heat exchange device being constructed and configured such that the compressed air flows therethrough over external surfaces of the combustion chamber prior to entering the combustion chamber,

the temperature of the compressed air being elevated by heat from the external surfaces.

86. - 284. (Canceled)